Counter-irritation:

A review of its theories,
with special reference to the
use and application of blister.
Counter-Irritation.

Introduction.

Counter-irritation, the subject to be dealt with in the following pages, is interesting to members of the medical profession for several reasons. It is one of the methods of treatment handed down to us by our predecessors of ancient times, frequently mentioned in their treatises, and successfully employed by them in the amelioration and cure of various diseases. Like some of our older remedies, its beneficial effects have been questioned, and perhaps there is a tendency to set it aside, like venesection and cupping, for others of newer origin. Its theories and action have been much discussed in numerous textbooks and medical papers, both ancient and modern, and the opinions expressed have differed widely, especially regarding the correct theory of its action.

For these reasons, namely, its ancient origin, its much discussed theory of action, and its undoubtedly beneficial results as a method of treatment, the subject of counter-irritation...
is well worthy of consideration, and in support of this I cannot do better than quote some of our authorities on the subject. Mr. Chiene says, "Counter-irritants are as yet little understood. Our very ignorance regarding the action of a blister, coupled with the frequency with which we use it, makes it one of the most interesting questions that can occupy our attention as thoughtful physicians and surgeons."

Another, "The value of counter-irritants is recognised by practised surgeons, and they are undoubtedly among the most effective local remedies we possess for combating chronic inflammation, yet their mode of action is difficult to explain."

Another, "The measures applied to this part, i.e. the therapeutical processes connected with the surface of the body, appear at first sight to be very simple, but their action is, on the contrary, extremely complex, and indeed still very obscure."

Again, "The actions of counter-irritants, although undoubtedly useful in pain and in causing absorption of chronic
exudations, is little understood and belongs to the most mysterious department of therapeutics. Another (5) "Some therapeutists have of late been disposed to question the value of counter-irritants on the theoretical ground of inability to explain their mode of action. These quotations will, I think, serve to illustrate the uncertainty that prevails regarding the correct action of counter-irritants, but this we do know, that their application is always followed by good results, if used in suitable cases. Thus the subject is well worthy of some consideration, and I would propose in this essay, to review the various theories that have been advanced as to the action of counter-irritants, to discuss their uses, and to give a full account of the numerous morbid conditions of the body, in which counter-irritants, more especially by means of the blister, may be found efficacious as a mode of treatment, giving, in conclusion, some practical points requiring attention in the application of blisters, to ensure a satisfactory result."
The Degrees of Counter-irritation

To understand the action of a Counter-irritant, we must first consider what is meant by the term "Counter-irritant." I should define a "Counter-irritant" as an agent, which, by its action of altering or quickening the circulation of the part to which it is applied, tends to promote the repair, or return to the healthy state of morbid conditions at the point of application, or at some distance from the point of application.

There are several degrees of Counter-irritants, and these I would briefly touch upon in passing. They may be arranged according to their degrees of action -

**Rubefacient.** These produce increased congestion and redness, which may be temporary or more prolonged. As examples of these we have hot water, mustard and others.

**Refractive.** These denote a further stage of rubefacients, and their application
is followed by a vesicle or blister. They may be represented by Cantharides.

Pustulants. These irritate isolated patches of skin, producing pustules, and are represented by Croton oil.

Escharotics. These destroy the skin entirely, producing a slough, and are represented by Silver nitrate and other caustics.

We have thus seen the various degrees of Counter-irritation, and it is to the class of vesicants or blisters that I propose to refer especially, as a convenient and satisfactory agent for the successful treatment of disease by the method of Counter-irritation.

Theories of Counter-irritation.

I propose now to review and discuss the several theories that have been advanced regarding the action of Counter-irritants. Let us first consider:
I. The Derivative or Evacuant Theory.

This is one of the oldest theories regarding the action of Counter-irritants. The Physicians of former times looked upon a specific humor or morbid principle as the true cause of all diseases, and their idea of the correct treatment was to drive this humor or morbid principle from the body. Hence it is easy to see that they should attribute the beneficial results of blisters and other Counter-irritants in the treatment of disease to this evacuant theory. They imagined that the serum produced by the action of the blister contained the morbid humor producing the disease, and that any benefit resulting from the use of a blister was due to this effect. What further influenced them in concluding this theory to be correct, was the improvement in the general condition of persons affected with exanthemata, when the eruption became fully developed. The rash, according to their idea, was the morbid principle driven from the blood. Such then were the conclusions the ancient Physicians held regarding the cause and treatment of
disease, and the theory of the action of counter-irritants by derivation or evacuation naturally seemed to be quite correct on these grounds. With our present knowledge of disease, I think it is unnecessary for us to consider this theory further, as it appears to be quite untenable and therefore may be dismissed.

While discussing this theory, I think it only right to refer to a method of treatment by counter-irritants, where there seemed good reason to suppose that the benefit derived from their use was due to the poison being removed from the blood in the serum of blistering. In 1861, Dr. Herbert Davies published a lecture on “The Value of Blistering in the Acute Stages of Rheumatism.” He advocated the “application of blisters varying in depth, but of considerable size, to be applied round each limb and in close proximity to the parts inflamed, and hoped to relieve the affected joints, partly on the principle of derivation, but mainly and really by affording through the serum...
Discharge from the blistered surface, a
ready means of exit for the animal poison.
Armblets, wristlets, thighlets, and leglets, and
even fingerlets were applied near to, but not
upon, every joint inflamed, at the very
height of the inflammatory stage, when
the local pains were most severe and the
constitutional disturbance the greatest.
The results - rapid relief of the pains, quick
convalescence, and freedom from cardiac
disease - were highly satisfactory.
Such then was this method of treatment
in rheumatic cases, and he gave no medi-
cines of an alkaline nature, in fact, he
found that after a full discharge of serum
had been produced from the blistered part,
the addition of an alkali rather tended to
retard convalescence. This theory of the action
was that the acid "materies morbi" was removed
in the serum of the blisters, and that the
change produced in the alkalinity of
the blood by the removal of this acid
principle, enabled the blood to redissolve
any lymph recently deposited on the
surface of the valves of the heart. As was
quite natural, this remarkable treatment caused much discussion at the time. Many supported Dr. Davies as a few of the following quotations will show. Dr. Day(6) "Although so many 'special remedies have been prepared for the treatment of acute rheumatism, and although without doubt they may each of them prove of service in properly selected cases, yet there is one that in my hands has never disappointed me in affording marked and almost immediate relief from those agonizing articular pains, which, with very few exceptions, are found to be present in acute rheumatic fever; and that remedy is the blistering method of Dr. Herbert Davies." Another(7) "In every case of acute rheumatism coming under my care for some time back, I invariably order the application of blisters to all the joints chiefly affected and with the best results. I have now tried it in a good many cases, and never in a single instance found it fail to give relief." More authorities could be quoted, all bearing evidence in support of this method of treatment, but there will suffice. As might be expected on the other hand.
the treatment met with considerable opposition owing to its severity, tendency to produce strangury and the fact that the alkaline treatment was sufficient. It is probably owing to these latter reasons, and the fact that we possess in salicylates a most efficient means of combating acute rheumatism, that this method of treatment has fallen out of use at the present day, still I think it is worthy of mention here, when we have been considering the action of counter-irritants by derivation, as Davies' treatment seems to have been beneficial through its derivative or evacuant action, thereby even at this later date, confirming the opinions of an older physician, who held this evacuant theory of the action of counter-irritants. More recently still, I find the blister has been used with a view of obtaining benefit by this derivative action.

Dr. Cameron Gillies (9) employed it with success in a case of a diphtheria, and he has since found it efficacious in other instances of a similar nature. The object of this method of treatment was the removal of the poison in the serum of the blister. Dr. Gillies, in commending it, says:
I. By the quick obstruction and local reversion of the fluids, the assumed poison is prevented from getting into the general circulation.
II. The poison is presumably withdrawn from the tissues in the fluid of the blister.
III. The tissues that are destroyed by the bite, and in which the poison would more certainly lie, are immediately and entirely thrown off.

Thus again we see an instance of the blister used to evacuate and derivate a poison from the blood, according to the idea of the ancient physicians, but while we may admit that counter-irritants may in special circumstances act thus, I think it will be quite evident from our knowledge of disease at the present time, that we must look elsewhere for a theory to account for the undoubtedly beneficial results following counter-irritation.

I would next consider another theory which has been advanced, namely, that counter-irritants act by metastases.

II. Metastases. This is a theory again based on the idea of an older physician, that two
Diseases could not exist in the same part at the same time. The chief supporter of this theory was John Hunter (10), who states thus: "As I reckon every operation in the body an action, whether universal or partial, it appears to me beyond a doubt that no two actions can take place in the same constitution, nor in the same part, at one and the same time: the operations of the body are similar in this respect to actions or motions in common matter. It naturally results from this principle that no two different fevers can exist in the same constitution, nor two local diseases in the same part at the same time." Illustrations of this in practice are numerous, namely, orchitis following mumps, orchitis following gonorrhea, and the disappearance of skin disorders when another disease manifests itself, as for instance, eczema abating when an asthmatic attack develops. There is little doubt that it was from this doctrine of metastasis that the idea of treatment by counter irritation arose. "Metastasis" (11) gave surgeons the hint which directed their attention to counter irritation, and its value in practice. No doubt counter irritation is an artificial metastasis."
Now the question comes to be: Do counter-irritants always effect their beneficial results in the very varying set of conditions in which they are employed by this action of metastasis? Is the production of a blister on the skin sufficient to account for the amelioration of various diseased conditions on the surface of the body, and in deeper structures, on the grounds of this metastatic action alone? I am afraid we can hardly hope to relieve or cure a case of pleurisy by the simple fact of making a blister on the skin, thus producing an artificial metastasis. We must endeavour to see how this metastasis is brought about, and what are the effects on the surrounding structures and organs, and then we may be in a position to understand the benefit derived from the blister.

In short, while metastasis may take place in various diseases of the body with beneficial result, I think the value of counter-irritants cannot be attributed to their producing an artificial metastasis, except as I have mentioned before, by the effects they exercise on the parts at or about which they are applied. These will be seen when we consider the theories of
Counter irritation that follow, and we may, in the meantime, set aside the theory, that the good effect produced by counter irritants, is solely due to the artificial metastasis thereby established.

The next theory to be considered is that the benefit derived from counter irritants is due to their action of depletion.

III. Depletion. This again was a favourite and much employed method of treatment in former days, and was carried out in various ways, such as blood letting, cupping, leeching etc. In some cases a large quantity of blood or serum was abstracted, and in others a much smaller amount. The production of a vessel filled with serum naturally led to the supposition that blood was withdrawn from the part, and the value of counter irritants was attributed to this depletion.

Depletion may be brought about in two ways:
1. Direct
2. Indirect.

By direct depletion is meant abstraction of blood where there is a direct vascular connection between the part to which the counter irritant is applied, and the diseased structure.
To take an example: the kidney is inflamed, we apply counter-irritation over the skin of the loins, and the kidney condition is relieved. Acting on this direct depleting theory the blood is abstracted from the kidney to the surrounding structures, as we know there exists a direct vascular connection between the skin of the loin and the kidney. That such a direct connection does exist is certain, as Sir William Turner(12) proved by injection "a very complete series of anastomosing arteries between visceral and parietal branches of the abdominal aorta."

In indirect depleting this bleeding is brought about, where there is no direct vascular connection, by reflex action through the nervous system, and it is this particular action of counter-irritants which has been so much discussed.

This leads us to ask the question, can we relieve or cure disease by withdrawing a certain amount of blood from a part in a morbid condition? I think we may certainly reply in the affirmative. Examples of this are numerous, as for instance, the relief felt when an inflamed finger is elevated or poulticed. By these means we diminish or abstract the blood in the affected part, and it is for this reason that relief is felt.
Thus I think it is quite clear that we do get beneficial results from depletion, and we must next consider how this depletion is brought about by counter-irritants.

When a counter-irritant is applied to a part, we note that the first effect produced is redness, and if the action be more severe, a vesicle filled with serum is the result. Thus it is quite evident that the cutaneous vessels are dilated and that the excess of blood contained in them must come from the structures in the immediate neighbourhood of the irritation, and in the case of the vesicle with serum, we have plasma drained from the vessels. Bearing in mind this direct vascular connection between the skin and subjacent organs, it is quite manifest that relief can be afforded to these organs by causing an increased flow of blood to the skin surface in connection with them, and thus producing a direct action of depletion.

When we come to consider the indirect depletive theory of the action of counter-irritants, we find a more complex problem before us. Seeing that there is no direct vascular connection in such
cases, we must recognise the fact that the action takes place through the nervous system in a reflex manner.

Brown-Sequard (13) thus states: "When we wish to produce a modification in the condition of any organ, we must apply the means of irritation that we prefer, to the parts of the skin or mucous membranes which have the most evident-nervous relation to it. In most cases the parts acting with greatest power upon another are those which receive the nerves from the same segment of the cerebro-spinal axis."

Dr. John Wood (14) demonstrated a close connection between internal organs and definite areas of skin surface through the rami communicantes. This has been further proved by the investigations of Dr. Lead (15) on referred pain. Drüger (16) found that "when cantharides collection was painted repeatedly over the back of a rabbit for fourteen days, the vessels underneath the skin, and the superficial layers of muscles were congested. The deeper layers of muscles, the thoracic wall, and even the lung itself, were much paler and more anaemic than those of the other side."
the know that impressions are conveyed through different nerves to the vaso-motor centre and from thence may be reflected by vaso-motor or vaso-dilator nerves to other parts. Let us take the lung, for example: (17.)"A blister is applied to the chest wall. The stimulus which it causes is transmitted up the different nerves to the vaso-motor centre: it is then reflected down the vaso-motor nerves to the pulmonary vessels, causing them to contract; while it is reflected down vaso-dilating fibres to the vessels of the thoracic wall and probably of other parts of the body also, causing them to dilate and thus lessening the pulmonary congestion by withdrawing blood from the lungs." Such then is the method of action of indirect counter-irritants, at least judging by the experiments on animals.

Mr. Chirens (18) in his essay on "A Counter-irritant: its action" considers that it acts by the method of depletion, but he is of opinion that a bleeding takes place between the vaso-motor centres. I would examine this theory shortly. He takes the kidney as an example and states that when
the kidney is inflamed, the blood vessels of the organ are dilated with a slow low congestion. He uses the word congestion for this to distinguish it from dilation of the blood vessels with a quickened flow, to which he applies the term determination. In congestion, the functions of the kidney are imperfectly performed, the kidney is in a state of inflammation. In determination, the function of the kidney is increased: when the blood vessels of the kidney recover their tone there is a condition which, relatively to the state of determination or congestion, is the of anaemia. He illustrates his theory with the following diagram.

The kidney (1) is in a state of inflammation. The blood vessels (2) of the kidney are congested. A mustard plaster is applied over the shin (3) of the loin: the result is a change in the vasomotor centre (v.m.c.) which rules the shin vessels (13). These blood vessels dilate. We have also, as a result of the counter-virulent to the shin, a diminution in the size of the kidney blood vessels (5). From a state of congestion they pass into a state of determination, with a free flow of urine, and from that to a normal condition, which is relatively one of anaemia. In consequence of the mustard,
A change has taken place in the vaso-motor kidney centre (V.M.C.) which rules the vessels of the kidney. The vaso-motor kidney centre has lost command, in other words, it is congested. When the plaster is applied it acts on the skin centre, it is altered, as evidenced by the condition of the skin vessels: it is congested. Where does the blood come from? From the neighbouring parts— from the vaso-motor kidney centre. Vascular tension is relieved: the centre regains its power. The kidney vessels are restored to their normal condition.

This is represented by another diagram showing the bleeding from kidney centre to skin centre, and in the case of the kidney, a direct bleeding between kidney and skin. In other organs—such as the lung— he considers that owing to the fact that this direct bleeding cannot take place between the skin and the organ affected, the benefit resulting must be due to the microscopic bleeding taking place between the skin vaso-motor centre, and the vaso-motor centre of the organ affected. This is a theory that is somewhat difficult to understand, and one that is almost impossible to investigate with accuracy.
owing to the minute changes that must be involved in its performance.

What we have next to consider is, that, granted this action of depletion does take place by the action of counter-irritants, can we benefit morbid conditions by the employment of remedies of that nature?

Let us look at two of the principal morbid conditions benefited by counter irritation and see how this action of depletion tends to relieve them. In the first place I would consider pain, especially in reference to acute inflammatory affections which, without doubt, can be relieved by the application of a counter-irritant.

"Pain,"(19) we must take it, "is probably due to the dilatation in the vessels and pressure on nerves by blood being pumped with violence through the dilated arteries against the obstruction of the capillaries."

From what we have stated previously, it is obvious that if this depleting action is brought about either directly or indirectly, we may anticipate benefit from the fact that blood is abstracted directly, in some cases from organs affected, to shin, and indirectly in others, from
reflex contraction of the vessels in the parts affected. Again in passive congestion, is it not reasonable to suppose that if we are able to withdraw a small portion of blood from the parts passively congested, the blood vessels may, by reason of this withdrawal, be able to resume their normal tone and thus overcome the morbid condition that has existed previously? Baring in mind the benefit derived from counter-irritation in these conditions, and the fact that this benefit results from the depletion which takes place from their use in such conditions, I think we cannot come to any other conclusion than that counter-irritants may prove a valuable means of treatment by reason of this action of depletion.

The next theory that we have to consider is that the value of counter-irritants depends on the stimulation they produce in the parts to which they are applied.

IV. Stimulation. Dr. Cameron Gillies, in his work, after reviewing the various theories of counter-irritation, concludes that all the beneficial results of the application of counter-irritants are due to this stimulation.
He propounds it as a new theory and states "Whatever good comes by the use of counter-irritants is because, by their irritant effect, they stimulate the activity of the tissues of the part to which they are applied and accelerate the blood supply there, so increasing nutrition or repair as the need may be."

Sir James Ross, writing in 1869 says "Both the beneficial and prejudicial effects of counter-irritants arise from their power of increasing the nutritive activity of the structures in the neighbourhood of which they are applied."

Again, Thos. Inman, in 1856 says "Blister is only useful in those cases in which stimulants would be locally applied by the surgeon if the parts diseased were on the surface of the body or within reach of his hand. Blister are not essentially different in their mode of operation from such stimulants as Iodide of Potash, Arsenic, Copaiva, etc. Blister are useful (in appropriate chronic cases) in proportion to the nearness of the diseased organ to the blistered surface."

Dr. Launder Brunton, in 1875 states "The beneficial action of a blister in callous
where is probably due to the increased supply of blood induced to the part by the application. Thus we see that this theory, namely that counter-irritants produce their beneficial results from the stimulation they bring about in the parts to which they are applied, has long held a place amongst the various theories propounded, and cannot be advanced as a new theory.

Regarding this theory, there is much to be said in its favour. We have only to look at the marvellous effects produced by the application of a blister to a callous ulcer, as an illustration of the good that may be done by the stimulation of the part to which the counter-irritant is applied. Now the question comes to be: Can we attribute all the good effects of counter-irritants to this stimulating action which they produce? In my opinion, we cannot altogether agree that the beneficial results following their use are solely dependent on their stimulating action. It has been stated that blisters should never be employed in acute inflammatory affections, but I have found, as I hope to show.
Later, considerable benefit from their use in these conditions, e.g. in pneumonia, pleurisy and pericarditis. Can we, in these cases, attribute the benefit to this stimulative action? I think not, and would be inclined to the opinion that the good effects are rather due to the depleting action they produce.

In chronic conditions, without doubt, the benefit derived is due to the stimulation effected in the part to which they are applied, but in acute cases we cannot attribute the benefit to this stimulation alone.

What mainly favours this stimulant theory is the fact that the local action produced by a counter-irritant, such as a blister, is a decided stimulation in the part to which it is applied, as is evidenced by the redness, or in other words, the increased circulation that is induced in the neighbourhood of its application. However, there is no doubt that this is one of the important theories of the action of counter-irritants, and one that is chiefly responsible for their value as a means of treatment in many chronic diseases.
The last theory I would briefly consider is that the benefit derived from counter-irritants is due to the influence they exert on the nervous system of the patient.

V. Influence on the Nervous System.

Dr. Humphrey (24) wrote "I now believe that blisters do immense good by diverting the patient's attention from the internal organ, or part affected."

Seeing that in some nervous and hysterical conditions we do get good following the use of blisters, it is quite reasonable to suppose that the beneficial result may be due, in some measure, to the fact that the patient's attention is specially directed to the irritation produced, thus taking the mind away from the supposed diseased organ. While admitting that, I think we cannot look upon this theory as a correct one for the benefits derived in all cases where Counter-irritation is employed, and those that are benefited by Counter-irritants acting on this theory are probably of a hysterical nature.

In conditions of coma, Counter-irritants are employed with good effect, and the benefit
Derived from their use is probably through their influence on the nervous system, stimulating the vital centres in the brain and cord. I shall speak of this later, in considering the use of counter-irritants in central nervous disturbances.

These then are the various theories that have been advanced as to the action of counter-irritants, and the conclusions I would draw from what has been stated are as follows:

1. That the derivation or evacuation theory is of little or no importance unless in some exceptional cases, such as acute rheumatism or poisoned wounds.

2. That the theory depending on the artificial metastasis provoked, may be left out of consideration, except in so far that the actions involved in the production of this artificial metastasis may account for the benefits derived from counter-irritants.

3. That the theory dependent on the depleting brought about directly or indirectly, is of
Considerable importance, both in acute and chronic morbid conditions, and that it is to this action that the good effects derived from the use of counter-irritants are, in many cases, due.

4. That the theory that counter-irritants are beneficial by the stimulation which they produce, is undoubtedly true, more especially in many chronic local diseased conditions.

5. That the theory crediting the benefit to the influence on the nervous system is of little consequence, except in hysterical cases and states of coma.

The Uses of Counter-Irritants.

Having reviewed the theories of counter-irritation, let us next look at the uses of counter-irritants as a method of treatment in various diseased conditions, medical and surgical. Counter-irritants may be used:
1. For the relief and cure of acute inflammation, it has been stated that counter-irritants should never be employed in acute inflammatory conditions, but I am of opinion that decided benefit can frequently be derived from their use in such cases. For instance, in acute pleurisy, as I hope to show later, the blister is a valuable means of treatment, even in the early stages. It has been held that no good can come from interfering with acute inflammation, and that, after it has been established, nothing can abort or cut it short. That may certainly be quite true, but I think we can, by the application of counter-irritants, aid the inflammatory action to a more speedy and successful termination. How can counter-irritants accomplish this in acute inflammation? We have seen that counter-irritants can act as agents of depletion, directly or indirectly, and I think that if an organ is in a state of congestion or acute inflammation can be relieved of a quantity of the blood then present in excess, the diseased organ can, for that reason, more speedily attain
its natural condition again. We have only
to experience the relief felt in a suppurating
finger when it is kept in a sling or pack?
used, to know that good can be done by
reducing the congestion in the part, and I
therefore see no reason to suppose that acute
inflammatory conditions in other situations
may not be relieved by diminishing the
congestion in these parts. Thus I think
we may safely conclude that counter-irri-
tants are a useful means of treatment in
acute inflammation.

2. For the relief and cure of subacute or chronic
inflammation, including passive congestion.
This perhaps includes the majority of cases
in which we see the benefit derived from
the use of counter-irritants. In such con-
ditions, we may have pathological pro-
ducts present, which must be removed or
absorbed before a cure of the disease can be
brought about, e.g. pleurisy with effusion.
In such a case we must endeavour to remove
the serum, which has been poured out in
the pleural cavity, to effect a cure. How
then can counter irritants benefit subacute or chronic inflammatory conditions? The two actions by which this benefit may be attained are:

I. The depleting action
II. The stimulative action of counter irritants.

Let us therefore consider cases of chronic inflammation with matted products, and then take as better illustrations than pleurisy with effusion and callous ulcer, and see how good may result from the use of counter irritants by reason of this depleting or stimulative action. We have here the pleural cavity in a state of chronic inflammation, with a small or large amount of serum present. We apply a counter irritant to the chest wall and watch the further progress of the case. In a short time we probably find the effusion diminishing rapidly, and after further applications, or even without them, the pleural cavity resumes its normal condition. How is this brought about? The serum must be reabsorbed by the vessels in the pleural walls, and seeing that we have, as a result of the application of the counter irritant, congestion and serum
proved out at the point of its application, I think we may attribute the good results to a kind of depletion. The blood vessels in the skin and neighbourhood being relieved of a certain amount of their serum by the blister, it is quite evident that this serum must be replaced, and owing to the congested state of the vessels in the pleural wall and the serum in the pleural cavity, is it not quite reasonable to suppose that the deficiency of serum may be made good from those parts which are in a state of chronic inflammation and passive congestion? The vessels being then relieved from a state of congestion by the withdrawal of some of their contents, it is clear that they may now be able to resume their natural calibre and activity, and thus carry the inflammatory process, which had been existing in a subacute or chronic condition, to a more rapid termination.

Thus it may be seen that this satisfactory result is brought about by the depletion taking place in the passively congested vessels in the pleural wall.
2. We have said that the value of counter-irritants in these cases may be due to the action of stimulation which is produced by their employment. Let us look at a chronic ulcer to illustrate this. A callous ulcers, which has existed for some considerable time, and has resisted treatment by various methods, may be found to heal rapidly after the application of a blister. The reason of this beneficial result is undoubtedly due to the stimulation produced locally by the blister. The hard indolent edges are stimulated by the irritant, the circulation is increased in them, and the vessels, again resuming their activity, set about to repair the diseased condition. Thus it is clear that the good effect of the blister is due to the stimulation of the circulation that takes place, thus hastening the process of repair.

That this stimulative action plays an important part in bringing about the benefits of counter-irritants in such local chronic inflammatory states is very certain.
3. For the relief of pain and spasm. This again affords a wide opportunity for the use of counter-irritants. Pain is due to two morbid conditions.

a. In acute congestion and inflammation the pain is caused by the pressure on the nerve fibres and endings by the distended blood vessels of the part affected, and by the increased exudation that takes place. Therefore to remedy this we must endeavor to diminish this congestion and thereby ease the nerve fibres. Here again we see that benefit may follow the use of counter-irritants, owing to the depurative action they produce.

b. In chronic conditions, where pain persists, the cause is probably to be found in the prevented nutrition of the nerve fibres. The nutrition of these fibres is impaired, they cannot adequately perform the work they should do, consequently the part cannot attain its healthy state again. Pain has been said to be "the prayer of a part for food". Therefore in such conditions we must endeavor to restore the impaired nerves to a healthy state, and the stimulating action of counter-irritants will assist us to carry this out. By our irritation we stimulate the circulation, now
blood is brought to the part, the nerves regain their normal state, and are enabled to carry on their functions.

Spasms are probably due to the same causes as pain, and are likewise relieved by counter-irritants.

Pain, I have said, is one of the chief indications for the use of counter-irritants, and without doubt, much benefit results from their use in suitable cases, where the action of depletion and stimulation is required.

4. For the relief of central nervous disturbances. We have mentioned before that some are inclined to attribute the benefits of counter-irritants to their influence on the nervous system. In cases of hysteria and such like, it is quite possible that good effects result solely from the fact that the balsam withdraws the attention of the patient from the supposed diseased organs to the new diseased condition artificially produced. But we get beneficial effects in other nervous disorders besides hysteria, where counter-irritants are used, and how is the benefit produced? In a case of unconsciousness arising, say from epilepsy or
narcotic poisons, we know that good results from the use of counter-irritants. Suppose in such a case we apply mustard to some part of the body, what happens? The impressions of the irritation produced locally are conveyed by the nerves to the centres in the brain. These centres are stimulated and aroused from a state of unconsciousness by the painful impressions conveyed. It has been stated that other centres in the spinal column and medulla, connected with viscera, are stimulated at the same time, and thus the cardiac, respiratory, and other organs may again be roused up into a state of activity. Thus it comes about that in states of unconsciousness, counter-irritants may prove a valuable means of treatment, by reason of the stimulation they produce on the centres in the brain and spinal cord.

5. To evacuate poisons from the system. I have discussed this previously, where we have seen that benefit may result in such conditions as acute rheumatism and poisoned bites by the use of blisters, in order that the
person may be drawn out of the blood. The use of counter-irritants to effect this purpose is exceptional, and the cases where we employ counter-irritants to effect a cure by this action are few. Still it is well worthy of consideration more especially as it probably involves the oldest theory of the action of counter-irritants.

Blisters as a Mode of Treatment in Practice.

I would now discuss the various morbid conditions which we, as Physicians and Surgeons, meet with in which counter-irritation may prove a valuable method of treatment. As a type of a counter-irritant, I cannot do better than choose the blister, which combines two necessary requisites, namely, convenience and efficiency. Therefore the following remarks are chiefly intended with reference to blisters. I would in the first place consider the various disorders which we, as Physicians, have to treat, and later on, deal with the surgical affections. To enable us to do this satisfactorily, I propose to deal with the systems of the body separately.
Nervous System.

There are a considerable number of diseases of this system where we find the application of blisters of great service as a mode of treatment. Neuritis.

In neuritis we can often do good, especially in the later stages, by the application of blisters. As I have stated before, the nerves in this condition are probably in an impaired state of nutrition, and their functions are improperly performed. We often find, in chronic cases, that a blister applied in close proximity to the nerves affected will have a remarkably good effect.

Facial Paralysis.

Consequently in facial paralysis, where the progress of the case is slow, we frequently observe remarkable improvement after a blister applied over the mastoid process. I have tried it on several occasions, and am thoroughly convinced of its efficacy. Similarly when we have other nerves affected, benefit may accrue from the blister.

Sciatica.

I have found in sciatica that the blister is a valuable method of treatment in chronic cases resisting other remedies. It may be applied
over the course of the nerve, but sometimes we find
that more good is derived when applied above
the back of the heel, that is, over the lower
part of the Tendo-Achilles.

**Neuralgias.**

In neuralgias we get good results when
blister is applied over the course of the
nerve, the benefit probably being due to
the stimulation produced.

**Spasm of muscles supplied by nerves.**

Again in spasms of the muscles supplied by
cranial or other nerves, we find the condition
ameliorated by the blister.

**Tinnitus Aurium.**

In tinnitus aurium we may give relief by a
blister over the mastoid process, also over the
nape of the neck.

**Vertigo.**

In vertigo the same remarks apply, relief
being produced by counter-irritants in both places.

**Headache.**

Headache may yield to irritants both at the
nape of the neck and over the mastoid. A con-
venient method of applying this form of
treatment in headache is to apply some
mustard mixed with water, spread on a flannel, over the nape of the neck and leave it on for ten minutes or a quarter of an hour. This often affords great relief even in influenza, and typhoid cases.

**Cerebral Congestion.**

Similarly in cases of cerebral congestion we derive benefit from blisters applied to the nape of the neck, as also in delirium, and cases of wakefulness in fevers, where refreshing sleep may follow their use.

**Coma.**

In cases of coma due to cerebral mischief or narcotic poisons, counter-irritants or blisters may help in treatment. They may ease the cerebral congestion present in such cases, or may stimulate the cerebral centres in others.

**Chronic Meningitis.**

In chronic meningitis, should other remedies fail, we may try the effect of the blister, and in some cases we may get benefit.

**Chronic Myelitis.**

Similarly, in chronic myelitis, it is well worthy of trial, though the hope of doing much good in such cases is small.
Tubercular Meningitis.
In tubercular meningitis I have several times applied a blister over the scalp as a last resort. I must confess I have never seen any good result from its use, and it undoubtedly causes a great deal of discomfort and pain, especially in children, so much so, that I think its use in such cases undesirable.

Hydrocephalus.
The same applies to hydrocephalus, where it is sometimes recommended, but I fail to see that much good can be expected from its use.

Hysteria.
In hysterical conditions however we may find the blister useful. It may be that the patient's mind is taken off her supposed diseased organs by the irritation which we have produced, and thus good may result from the application.

Hysterical Aphonia.
There is no doubt that in hysterical aphonia benefit may be derived from the application of a blister on the earynx, and I think in hysterical cases, one is quite justified in resorting to this remedy when others fail.
Epilepsy.
In epilepsy I think we can hope for little benefit from counter-irritants.

Circulatory System.

Endocarditis.
In endocarditis I think we are justified in the application of blisters, in the hope of benefiting the condition. In acute cases we can certainly do no harm by applying a blister on the cardiac area, and I have frequently seen good result from its use. In a case of endocarditis be it acute or of recent origin, the treatment by blistering should certainly be given a trial. I have been gratified with the result in several such cases.

Pericarditis.
In cases of pericarditis the blister is a most valuable means of treatment. In such cases we are advised to apply the blister, not on the pericardium, but at some distance from it. So far as I have seen, the point of application makes little difference to the result, and in all cases of pericarditis I at once apply a blister. I have always found such a
Case much relieved by this treatment, the pain being subdued and the breathing eased. Consequently I took upon the blisters as a highly satisfactory remedy in such cases. These diseases, endocarditis and pericarditis, so often accompany rheumatism, that it is interesting to note that the blisters have been used as a preventive measure of these complications in acute rheumatism, but of this I shall speak later.

Pulmonary System.

Several of the diseases of this system are alleviated by this treatment.

Acute Laryngitis.

Here we may try the application of blisters to relieve the condition.

Chronic Laryngitis.

This I have often seen benefited by the blisters. Cases that have resisted other methods of treatment for long periods, frequently yield to the application of a blister on the larynx. I have tried this measure in several cases, and am always well satisfied with the result.
This disease may be conveniently discussed here. It affords a valuable example of the benefit derived from blistering. Here we have a disorder which often proves rapidly fatal, if not relieved by emetics, etc. In such cases, if we do not find improvement following the early use of emetics, I think the next most valuable means of treatment lies in blistering. I have, on several occasions, when the disease continued unabated after the administration of Ipecacuanha or other emetics, applied a blister over the larynx, and in most instances have found it efficacious. I must admit that it has failed and a fatal result has ensued, but on the other hand, I am convinced that in some cases this has been averted by the blistering treatment. Such has been my experience that if the usual emetic treatment has failed, I invariably resort to the blister as the next most satisfactory method of treatment in this serious and often fatal malady.

Pneumonia.
The value of blistering in this disease has been much discussed. Formerly this treatment
was extensively employed in the alleviation of this disorder, but according to our present knowledge of the disease, it is difficult to see how much benefit can result from its use. Still, I have frequently seen it used, and employed it myself with satisfactory results. An older practitioner, with whom I was associated for several years, in cases of acute pneumonia invariably applied the blister, accompanied with the calomel and opium treatment. In his experience of over thirty years he had found it invaluable, and continued to use it to the last, and I must admit, that in a large number of cases, the result was good. As I have said, with our present knowledge of this disease, namely, that it is an acute infective fever, it is difficult to see how good can result from this treatment, still, it may be that if we can, by the blister, relieve the congested state of the inflamed lung by a process of depletion, the organ may then be in a condition more able to combat the process and bring it to a satisfactory conclusion. Thus it comes to be that I have considerable confidence in the treatment of pneumonia by blistering,
And though it may seem severe, on account of the discomfort produced, especially in young children, I am of opinion that it is a method of treatment that should be adopted more frequently than it is, in bringing this severe and often fatal disorder to a satisfactory termination.

Pleurisy

This disease again affords a wide field for the benefits attained by the use of the blister. Both in acute and chronic cases we find it invaluable. In acute pleurisy, that is, in the early stages with a distinct friction sound and no effusion, I invariably find a large blister of immense service. It without doubt relieves the pain, eases the breathing, and makes the patient more comfortable in every way. I am convinced that a blister, if applied early in this disease, tends to prevent it reaching the stage of effusion, and thereby affords us a most valuable means of treatment in this disorder. Consequently in an acute case of pleurisy, I always apply this method of treatment, and without exception, find it of the greatest service.
In preventing the disease reaching the effusion stage. In chronic pleurisy, that is, pleurisy with effusion, the blister, again proves the best means of treatment. We frequently meet with cases of pleurisy in this stage, when the disease has been overlooked in the early stages and the patient comes with the chest filled with fluid. Without doubt the proper treatment here is to try the effect of a large blister on the affected side. The result is generally gratifying, and in a few days we find the effusion rapidly diminished. I know it has been advised, in these cases, to apply successive blisters on the affected area, but, in my experience, more benefit is obtained by the use of one blister of considerable size. I have, over and again, found this treatment yield satisfactory results, and in this disease no other method of treatment can compare with a large blister over the region affected.

Phthisis.

In the early stages of this disease the treatment by blistering is often employed with good effect. When we get a case of
commencing phthisis, when the physical signs are not markedly developed, I think much benefit may result from the use of small blisters, frequently repeated, over the affected part. In such a condition, I believe small blisters, repeated at intervals of some days, form a valuable means of treatment. Again in cases of phthisis we often have patches of dry pleurisy developing during the course of the disease, and this may be much relieved by the application of a blister over the spot where the friction is present. Thus we find the blister of service in this disease.

Diseases of Organs of Locomotion.

Here we may consider Rheumatism.

In acute rheumatic fever I have already shown that the treatment by blistering was, at one time, much employed, and need say no more about its use here. We know that this disease has many complications, I refer...
especially to endocarditis and pericarditis. Can any steps be taken to avoid the occurrence of these complications? Here again we find the application of blisters advocated as means of prevention against such.

D. C. A. Gibson (26) in an article on "The effects of rheumatic fever on the heart" says as follows: "One other method of treatment remains for consideration, and one which, notwithstanding the recent expression of opinion by Mitchell Bruce, (26) seems to me of the highest value. This is counter-irritation. For a good many years it has been my custom to employ counter-irritation about the praecordia in every case of acute rheumatism and the results have been eminently satisfactory. The method has consisted in the application of small fly-blisters every night or every second night over the praecordia and their neighbours and I am able most thoroughly to agree with Catlin as regards their utility."

Catlin (27) advised the application of small blisters (about the size of a florin) between the clavicle and the nipple over the first, second, third and fourth dorsal intercostal nerves, either on the right or the left side, for the prevention
of cardiac complications, and especially as a prophylactic measure against rheumatic valvulitis. The blisters are applied one at a time, and repeated at different points, and each one is followed by a small puncture to keep up a gentle stimulation of the nerves. This treatment, he found, yielded satisfactory results.

Thus we have good authority regarding the value of blisters as a means of prevention against the serious complications encountered during acute rheumatism, and blistering should undoubtedly be employed as a prophylactic measure in this disease, and should these complications have already ensued, as a curative measure. The effects of these complications being so serious in after life, no steps should be omitted which will tend to prevent or remedy their occurrence.

Chronic Rheumatism.

In various manifestations of this disorder, the blister is of service. In cases where the joints tend to remain in a chronic condition, being swollen and painful, the application of
state. Similarly, in chronic rheumatic affections of the muscles, much benefit follows the use of a blister.

Rheumatoid Arthritis.
This disease often resists treatment by drugs. Sometimes we may effect considerable amelioration of the condition of the joints by the repeated application of small blisters. Blistering is well worthy of trial in this disease and frequently is of decided value.

Gonorrhoeal Synovitis.
This again is a disease where treatment by various methods often fails. Such being the case, the application of a blister should certainly be tried, and in some cases we find benefit following its use.

Diseases of the Skin.

Eczema.
Blistering has been used in intractable cases of this disorder.
D. Crocher (28) recommends counter-irritation over the neck or bones with mustard or
blistering fluid, in order to influence the vasomotor system.
I am unable to confirm the value of this method of treatment, never having tried it.

Callories.

For there, such as occur on the back of the heel, I have sometimes seen benefit follow the blister.

Lupus.

Blistering have been employed in this condition, and, by some, are said to give satisfactory results.

Dr. Cameron Gillies (29) says, "I myself have used blistering fluid in all such cases as have come my way for some years, and I am thoroughly satisfied with the results: and I am further satisfied that if the health is rigidly cared for, the blister leaves the scrafr, in such conditions, with far worse than no excuse."

 Alopecia.

In this disease without doubt the best results follow the blistering treatment. When scattered patches occur over the scalp, it is advisable to have it shaved completely, and blistering fluid applied
over the entire area. My usual plan has been to divide up the scalp into three or four areas, painting each in turn, with an interval of some days between the applications. The cure of this condition is always tedious, but I am convinced that the blistering method gives the most satisfactory ultimate result.

Diseases of the Alimentary System.

Tonsilitis.
In cases of this disease where we find the progress slow, I think we may sometimes find the blister efficacious. I have tried this treatment in several such cases, and have found the result beneficial, the reparative process being thereby hastened.

Chronic Tonsilitis.
In this condition blistering may do good. One is frequently consulted about a chronic enlargement of the tonsils, and before resorting to excision, I am of opinion that
the treatment by blistering externally, should be given a trial, in the hope of benefiting the condition.

**Vomiting and Gastralgia.**

In many conditions where these distressing complaints exist, I think the blister aids us as a means of alleviation. I have noticed, on several occasions, where severe vomiting occurs, with symptoms suspicious of gastric ulcer, the physical signs being somewhat obscure, that a blister painted over the epigastrium will afford relief. I think the result is due to the fact that the blister stimulates the nerves in the stomach, thus producing improved nutrition in that organ. It has been my practice, in cases of obstinate vomiting, to resort to this treatment, and I must admit that it has yielded gratifying results in many cases, and is well worthy of trial.

The vomiting of pregnancy has been arrested by blistering over the fourth or fifth dorsal vertebra, but I have never had recourse to this method of treatment.
Appendicitis.
In acute cases of this nature I have applied the blister along with the calomel and opium treatment with good results. In chronic cases, where considerable thickening and maling has taken place, the blister is very efficacious in removing the morbid condition.

Conception of Liver.
Relief is often experienced in such cases by a blister applied over the organ.

Diseases of Ductless Glands.

Cystitis.
The may find cases of this disease improved by the application of blisters. They are worthy of trial where other remedies fail to relieve the condition.

Blisters in Surgical Affections.
Surgeons often find the blister a valuable adjunct to other methods of treatment in
Numerous disorders which they are called upon to treat. I now propose to consider some of these.

**Chronic Inflammatory Processes.**

As I have stated before, the blister is especially efficacious in such conditions. Many of these chronic inflammatory processes come under the surgeon's care. The morbid condition may exist in various structures, such as glands, joints, bone and skin. In a large number of these cases, the blister forms on best means of cure. It is quite unnecessary to consider separately all the numerous chronic inflammatory processes that we, as surgeons, meet with in practice, and it will suffice to say, that there is no other method of treatment equal to the blister in bringing these chronic processes to a successful termination.

**Callosus Ulcer.**

This condition is very markedly improved by blistering. It is well known how obdurate such cases are; they resist all attempts at cure, and discourage both patient...
and practitioners alike. The blister has been
often extremely useful in hastening the
process. The edges of these ulcers are hard
and lifeless, and it is to improve the
condition of these edges that our blister
is applied. It has been my custom in
these chronic ulcers, to pour a liquid blister
over the hard edges. In a few days one
often observes a remarkable improvement in
the condition of the ulcer. The hard edges
have become more vascular, the superficial
deep layer of the skin peels off, and under
neath we have a much more healthy gran-
ulating surface. Blistering in such cases
is much to be recommended, and, to me,
appears to be the best method of dealing
with these chronic troublesome cases.

Enlarged Cylindria. Strumous or otherwise,
we may find in these affections that
benefit may result from the blister.
It may appear a rather severe measure
in such cases, and one perhaps more
frequently employs iodine or mercurial
ointments. Still, the principle on which
they act is the same, namely Counter-irritation.
In glands which have broken down and suppurred, we often find thickened in-
colobent scars left, over the seat of the gland. This I have on several occasions improved
by the application of a blister.

Cysts.
In some cases of this character one may
find good result from the blister, and
it is worth a trial should other remedies
fail.

Poisoned wounds.
There I have dealt with before, and
shown that the blister has been held to
act as a derivative agent for the removal
of the poison in such conditions.

Joints.
In various affections of joints, the blister
is invaluable. In sprains the process
may be much hastened by the blister.
Probably it acts by improving the nutrition
of the part, and should the sprain be
slow to recover, the trial of a blister is
certainly worth consideration.

Reynolds.
Again in chronic cases of effusion in
joints, the blistering method of treatment proves very satisfactory. Many such joints improve rapidly after its use, and I think the blister is the most sure and speedy means of getting rid of the effusion. I have always been satisfied with the results obtained, especially in the knee joint.

3. Synovitis.

The above remarks apply to cases of this kind, as well as to cases of chronic synovitis, where I have frequently seen absorption follow the use of the blister.

Such then are the main surgical affections improved by blistering, and examples of these will readily occur to one in practice. Surgeons, as well as physicians, have good reason to be satisfied with the results of the blistering treatment.

There still remain two classes of cases to consider.


In some diseases of this organ, be they acute or chronic, relief may be obtained by a
blisters applied over the temple. For example, iritis may be improved after blistering.

Diseases of Genitourinary Organs.

Ovaritis.
In ovaritis, blistering affords ease and tends to improve the condition. In acute cases a blister applied over the organ markedly relieves the congestion present. In chronic cases, still greater benefit may result from its use. I have on several occasions found the patient relieved of this distressing complaint, after being sharply blistered over the affected area, and am well satisfied that good follows the use of the blister in such cases.

Dysmenorrhea and Leucorrhoea have been treated by blistering over the spine, but this method of treatment I have not tried.
The Application of Blisters.

Let us now consider some practical points requiring attention in the application of blisters, to ensure a satisfactory result. In the first place, what kind of blister should we employ? To answer this question, we must consider what form of blister is the most easily applied, the most cleanly, and especially the most reliable.

There are three distinct classes of blisters which are in use, namely, the Implanturum Cantharides, the British Pharmacopoeia Liquid Blisters, and Others. Liquid Blisters prepared by various manufacturing Chemists.

Regarding the Implanturum Cantharides, there is little to be said in its favour. It is certainly the oldest, and, up to later years, perhaps the commonest form in which the fly-blister is applied. It is troublesome to prepare, and often unreliable. I have several times found it fail, and when I now employ it, always prepare it myself. There is also the disadvantage that in removing it, one
is apt to leave some particles on the skin
or tear away part of the raised cuticle.
Absorption is said to take place more
readily from this class of blister. The only
point in favour of the Implosium
Cantharides is, that this form of blister
is not removed at any time, and its active
effect terminates, which cannot be done
with liquid blisters.
The liquid blister prepared according to
the British Pharmacopoeia is unreliable,
and consequently I never resort to this form.
There is no doubt that a liquid blister
is the cleanest, most convenient, and in
my opinion, the most reliable.
There are several situations where it is
most difficult to keep the Implosium
Cantharides satisfactorily applied, and
the liquid blister overcomes this. Many
excellent liquid blisters preparations
are made at the present day by various
Chemists and, in my experience, that
prepared by Messrs. J. and H. Smith and
Co. Manufacturing Chemists, Reading,
is one of the best and most reliable.
The only objection to these liquid blisters is their severity, but, in the other hand, this is frequently a decided advantage, and an ultimate effect more speedily attained. Taking everything into consideration, a liquid blister is the most satisfactory form of applying Cantharides.

Regarding the actual application of a blister, a few points require attention. It is a good plan to first wash the skin with warm water. This removes any greasy or oily matter which may be present in cases where poisons have been previously employed, and further tends to promote a better effect from the blister.

If the Impiaetum Cantharides is used, the plaster should be applied over the blistered area, and kept in position by a bandage or large handkerchief. It should be left in for eight or ten hours at least in most cases, and its removal will be much facilitated if a warm paraffine be applied over it.
About half an hour before the time of removal. After it has been removed, I am in the habit of applying another poultice, as I think thereby a more satisfactory blister is formed. After this second poultice is removed, the best dressing is some absorbent cotton-wool.

I always give instructions to keep the blister intact, if possible, for two days at least. By doing this more benefit is, I think, attained from the blister, and, what is equally important, the blistered surface heals more rapidly, and with certainly less discomfort to the patient, if this precaution be taken. This cotton-wool dressing I allow to remain on for two days or so, warning the patient that if any serum should be felt coming from the blister, the dressing should be undone, and means taken to prevent the serum running over adjacent parts and blistering them, as I have sometimes observed. If the blister is still intact after two days, I then evacuate the
Contents and apply a dressing of some simple ointment, such as zinc oxide, for a few days. Lard oint does quite well in the poorer class for this purpose. When the liquid blister is employed, it is painted on and allowed to dry, and the cotton wool dressing then applied, and the same after-treatment adopted. Another point to consider is, what is the best time of day to apply a blister? How there is no doubt that one point that furthers the effect of a blister is rest, and in many cases where we apply blisters the patient must rest for a few days. It might be supposed that the best time for their application would be at night, but this is not so, as the irritation and distress produced during the few hours subsequent to their application, will probably prevent the patient obtaining much sleep that night. Consequently I think the morning is always preferable as a time for application, as by the time the patient should be going to sleep, the irritation is
settling down.

Blister dressings should not be applied too near meal-times, otherwise the digestive processes may be disturbed.

I have often found it a good plan to give an opiate shortly after applying a blister. The restlessness and irritation produced by the blister is alleviated during the time it is rising, and it may prevent the occurrence of strangury. This may sometimes prove troublesome, and care should be taken in applying the blister, that the surface on which it is applied is not unduly extensive.

At the time of application it is always advisable to warn the patient that strangury may occur. The necessity of doing this is well illustrated by the unpleasant consequences that may take place, when a blister has been applied to a patient in the country some considerable distance from home. On two occasions, when in a large country practice, I found it advisable to apply blisters to patients who resided more than twenty miles
from my house. I had taken the necessary
precautions of warning them against
strangury, and even left an opiate in
case it should arise. In spite of my
instruction, in each of these cases I was
summoned back within a few hours, in
fact, in one case I had not completed
my homeward journey before being in-
tercepted by a message to come back at
once, as the patient was so much worse.
In both patients strangury had unfortu-
nately supervened, and such an experience
makes it a matter of great importance
to warn patients about its occurrence and
instruct them what steps are to be
taken for its relief. As I have said,
an opiate administered at the time
the blister is applied often prevents
it, and in the event of it coming on,
the patient should have some opiate at
hand to relieve him. Hence it is a
good plan to leave an opiate, such as a
 Jail. Opii gr. t. which may be taken if it
does occur. This, combined with a warm
poultice, applied over the bladder,
and demulcent drinks, such as soda water, barley water, or cream of tartar and water, will, in most cases, completely relieve the condition.

In certain cases the application of blisters must be used with caution. This especially applies to their use in young children. In such cases we may find the discomfort produced is excessive, and in feeble children we may have distressing sores produced, which are difficult to heal.

The same remarks apply to their use in aged feeble persons, where the constitution is weak.

Again, in kidney diseases, the use of blisters is undesirable owing to the irritation in the kidney which may be produced by their application. In pregnant women they should be used with caution, as also in women about the menstrual period.

Recollect these facts in mind, blisters may safely be applied with good results and without much discomfort to the patient.
Another point for consideration is whether one single large blister, or several small ones, successively applied, should be employed. This is a matter that can only be determined by the nature of the case in which the blistering treatment is adopted. In acute diseases there is no doubt that more benefit is obtained by a large blister, as in this condition we desire a speedy and sharp action brought about. In chronic inflammatory affections more good may certainly be derived from small blisters successively applied. In such cases a slow, gradual stimulation is desired, and such is best attained by successive applications to the diseased area.

Thus no decided answer can be given to this question, but each case must be treated by the method that seems most advantageous. One further point remains, and that is whether blisters should be applied over the part affected, or at some distance from it. In the majority of cases, I am of opinion that most good results from blisters applied directly over the affected area.
In pericarditis, it has been advised that the blister be not applied directly over the pericardium, but I have failed to see much difference in the results in whatever area it is applied. However, the fact remains, that a blister applied in another part may relieve, after it has failed over the affected area, for example in sciatica, where most benefit may follow its use over the back of the tendo Achillies, than over the course of the nerve itself.

In bringing this essay to a close, I would briefly indicate a few practical conclusions derived from a study of Counter-Irritation.

I. That, though the correct theory of the action of a Counter-Irritant is as yet imperfectly understood, benefit results from its use in the majority of cases, by reason of its depletive or stimulative action.

II. That in many resistible diseased conditions
acute and chronic, counter-irritation is a valuable means of treatment.

III. That the blister is a typical example of a counter-irritant, and that a liquid blister is preferable, in account of its easier application and more reliable results.

IV. That in acute cases one large blister, and in chronic cases several small blisters successively applied, yield the best results.

V. That, with care in its application and after-treatment, blisters may safely be employed with little discomfort to the patient.

VI. That the blister should be more extensively adopted as a method of treatment than it is at the present day.
References

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5. Larrin’s "Dictionary of Medicine".
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15. Dr. Head. "Brain". 1893.
1. Diagram of lung congested.

- Vaso-motor centre.
- Vessels of thoracic wall.
- Vessels of body generally.
- Dilated vessels of lung.

2. Diagram explaining action of blister.

- Vaso-motor centre.
- Thoracic wall.
- Blister.
- Vessels of body generally.
- Contracted vessels of lung.

Diagrams illustrating Mr. Chéne's theory of counter-irritation.